# Revitalization of Nuclear Research in the U.S.

## FY 2004 Nuclear Energy, Science and Technology Budget Request

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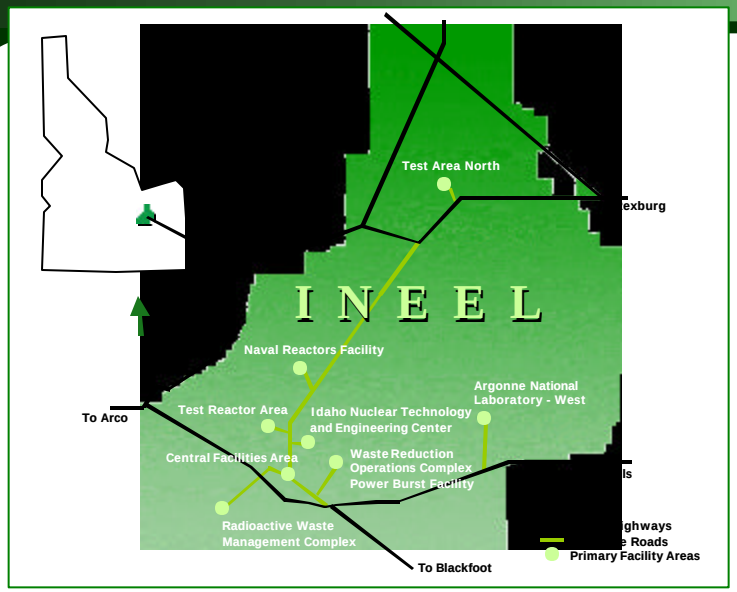
**Office of Nuclear Energy, Science and Technology**
**U.S. Department of Energy**

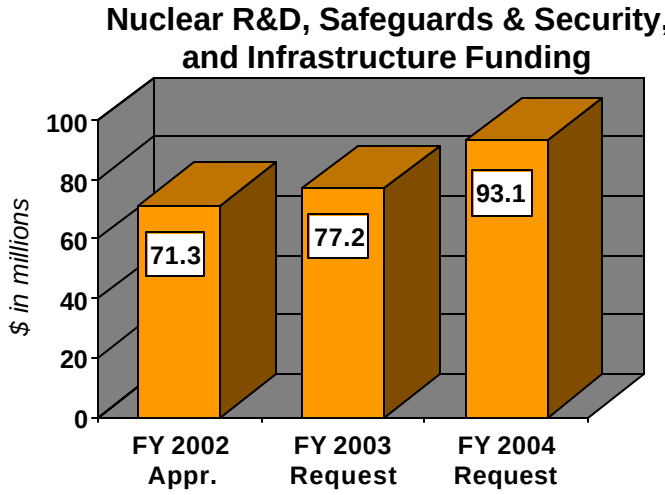
February 3, 2003

# Revitalization of Idaho National Engineering Laboratory

In Cooperation With

EM U.S. Department of Energy Office of Environmental Management

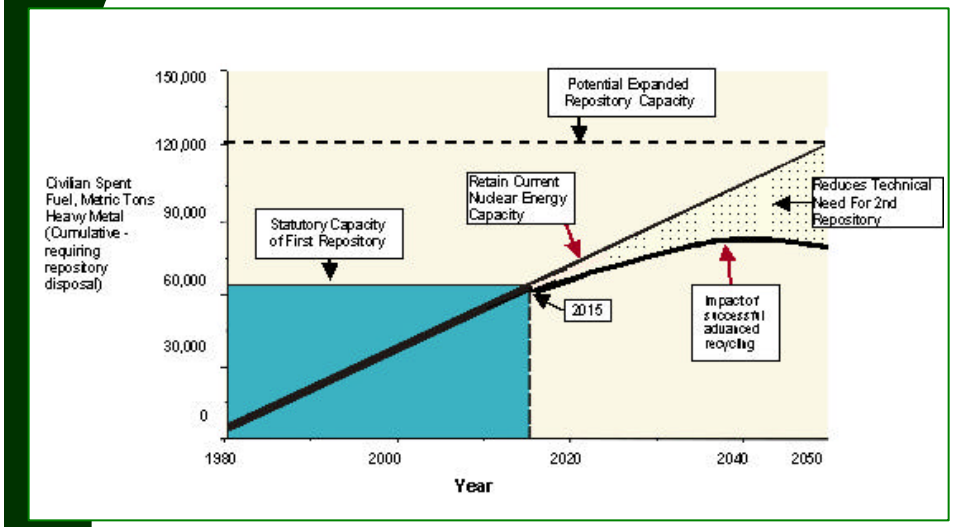



- **On July 15, 2002, Secretary Abraham announced a major mission realignment for INEEL**
- **INEEL will become a world-class nuclear laboratory focusing on R&D such as:**
  - Generation IV nuclear energy systems and advanced fuel cycles
  - Advanced space nuclear power and propulsion systems
- **Success in environmental cleanup will be essential to the growth in the nuclear program at Idaho**

# Advanced Fuel Cycle Initiative:
## *Optimizing Spent Nuclear Fuel Disposition*

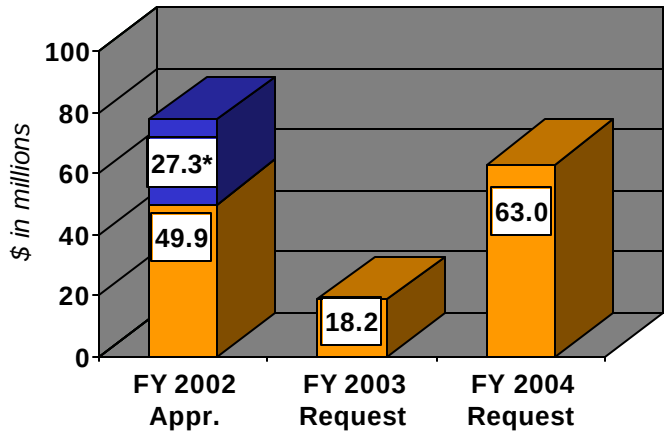
In Cooperation With
YUCCA MOUNTAIN PROJECT
OCRWM




? **Built on international cooperation and collaboration (*e.g.*, France and Russia) and integrated with Generation IV**

? ***Report to Congress on Advanced Fuel Cycle Initiative: The Future Path of Spent Fuel Treatment and Transmutation Research* issued (January 2003)**

**Advanced Fuel Cycle Initiative Funding**




**Activities related to deactivation of EBR-II.*

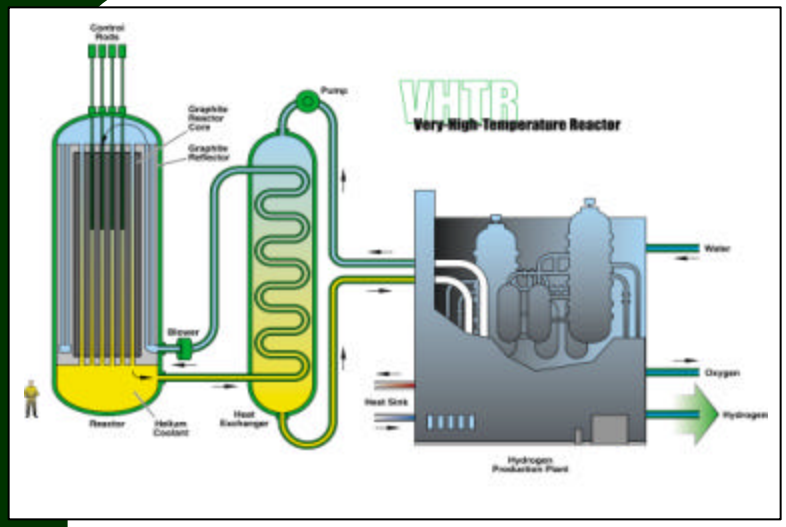
## Planned Accomplishments -- FY 2004

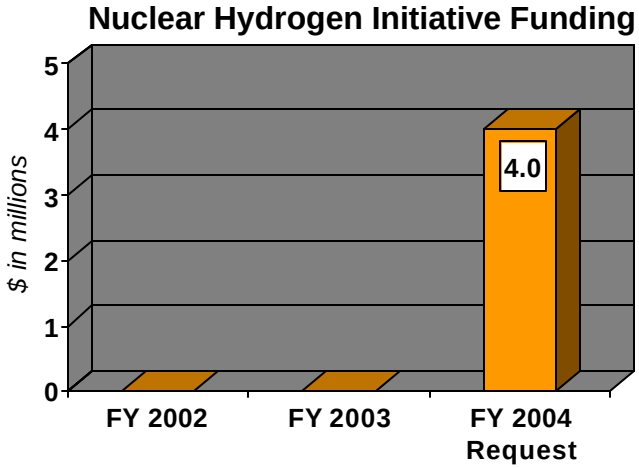
? **Conduct research on proliferation-resistant fuel treatment technologies**

? **Develop technologies to reduce toxicity and heat load of fuel sent to a geologic repository**

? **Award additional 10 to 12 transmutation science fellowships to U.S. universities**

# Nuclear Hydrogen Initiative: *Developing Nuclear Energy Systems for Clean and Abundant Hydrogen Production*




? **Nuclear energy systems offer opportunity for economical, clean, and abundant source of hydrogen**

## Planned Accomplishments in FY 2004

? **Complete a Nuclear Hydrogen Technology Roadmap**

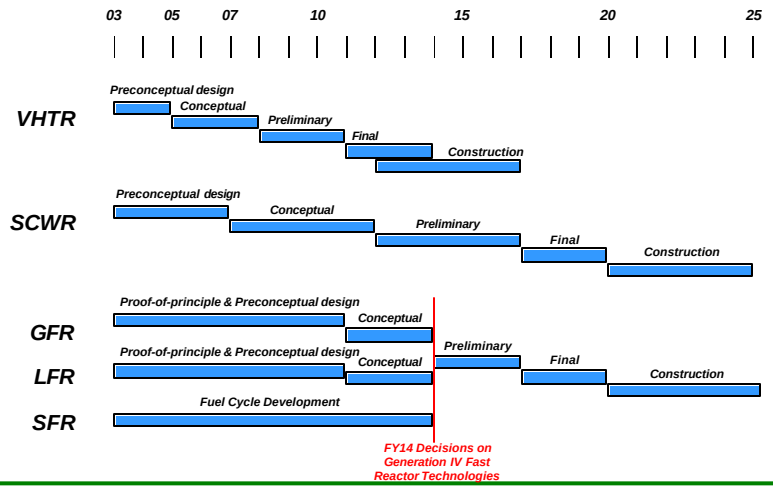
- **Built on National Hydrogen Energy Roadmap and inter-office cooperation**
- **Define R&D required to develop an integrated nuclear hydrogen production plant**

? **Develop concept for an integrated nuclear hydrogen production system**

? **Initiate R&D on high temperature and corrosion resistant materials for thermo-chemical process**

# Generation IV Nuclear Energy Systems:
## *Nuclear Power for a New Century*

### *Potential Generation IV Timelines*




In Cooperation With

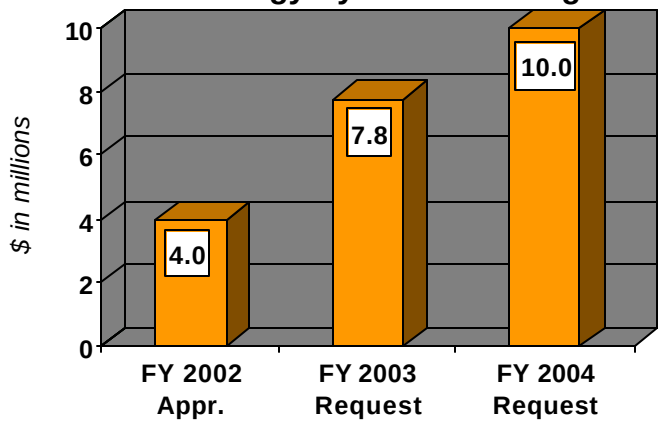
GENERATION IV International Forum

? **Developing advanced nuclear energy systems for deployment after 2010 and before 2030**

? **In September 2002, the 10-Nation Generation IV International Forum agreed on 6 advanced technologies, including:**

- Very High Temperature Reactor (VHTR)
- Supercritical Water Cooled Reactor (SCWR)
- Gas Cooled Fast Reactor (GFR)
- Lead Cooled Fast Reactor (LFR)

**Generation IV Nuclear Energy Systems Funding**



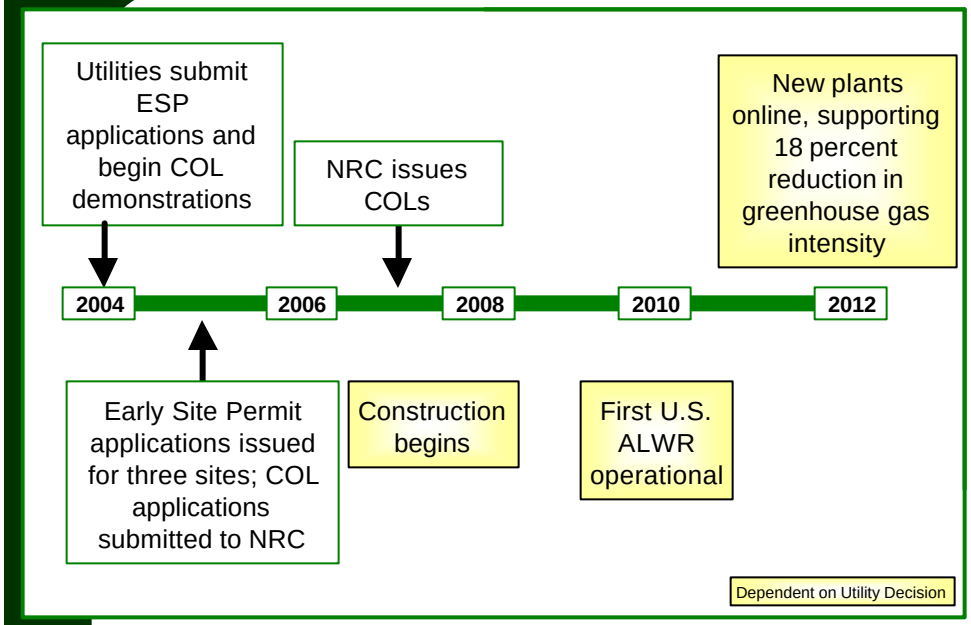

## Planned Accomplishments -- FY 2004

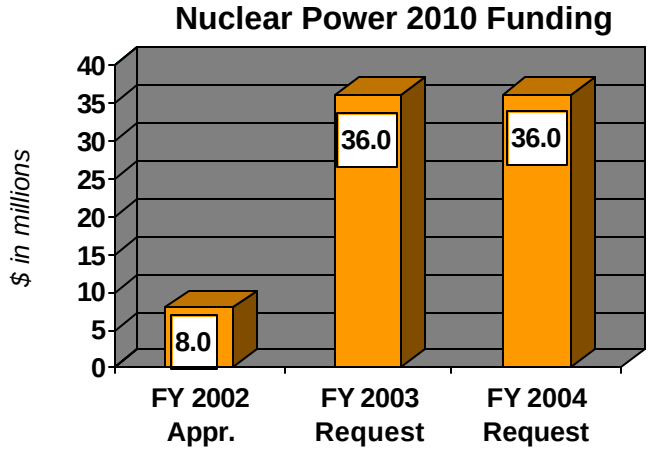
? **Conduct major VHTR trade studies**

? **Complete feasibility study on GFR fuels studies**

? **Initiate mechanical and irradiation tests on advanced materials**

# Nuclear Power 2010:
## *Paving the Way for New Nuclear Power Plants*




- **U.S. utilities are examining the business cases for new nuclear plants in the U.S.**
- **Cost-shared regulatory demonstrations and R&D on advanced technologies underway aimed at deploying new plants by 2010**

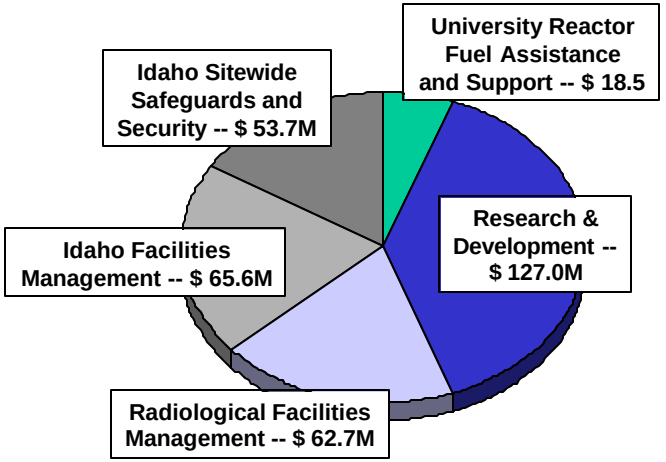
**Planned Accomplishments -- FY 2004**

- **In FY 2003 and FY 2004, DOE will select industry partners for demonstration of Combined and Operating License (COL) processes**
- **Advanced gas cooled reactor fuel development program continues in FY 2004**

# FY 2004 Nuclear Energy, Science and Technology Budget Request

(dollars in thousands)

| | FY 2002 Comparable Approp. | FY 2003 Comparable Request | FY 2004 Request to Congress | FY 2004 vs. FY 2003 | |
|---|---|---|---|---|---|
| **University Reactor Fuel Assistance and Support..** | 17,500 | 17,500 | 18,500 | +1,000 | +6% |
| **Research and Development** | | | | | |
| Nuclear energy plant optimization..... | 6,293 | —— | —— | —— | —— |
| Nuclear energy research initiative..... | 31,081 | 25,000 | 12,000 | -13,000 | -52% |
| Nuclear energy technologies..... | 11,867 | 46,500 | 48,000 | +1,500 | +3% |
| Advanced fuel cycle initiative..... | 77,219 | 18,221 | 63,025 | +44,804 | +246% |
| Nuclear hydrogen initiative..... | —— | —— | 4,000 | +4,000 | —— |
| **Infrastructure** | | | | | |
| Radiological facilities management..... | 58,933 | 54,180 | 62,655 | +8,475 | +16% |
| Idaho facilities management..... | 63,289 | 68,425 | 65,560 | -2,865 | -4% |
| Idaho sitewide safeguards and security..... | 40,295 | 40,215 | 53,651 | +13,436 | +33% |
| **Program direction.....** | 57,237 | 56,834 | 60,207 | +3,373 | +6% |
| Use of PY balances ..... | -818 | —— | —— | —— | —— |
| **Total.....** | 362,896 | 326,875 | 387,598 | +60,723 | +19% |



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